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## Efficacy of HIV/STI Behavioral Interventions for Heterosexual African American Men in the United States: A Meta-Analysis

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## Abstract

This meta-analysis estimates the overall efficacy of HIV prevention interventions to reduce HIV sexual risk behaviors and sexually transmitted infections (STIs) among heterosexual African American men. A comprehensive search of the literature published during 1988–2008 yielded 44 relevant studies. Interventions significantly reduced HIV sexual risk behaviors and STIs. The stratified analysis for HIV sexual risk behaviors indicated that interventions were efficacious for studies specifically targeting African American men and men with incarceration history. In addition, interventions that had provision/referral of medical services, male facilitators, shorter follow-up periods, or emphasized the importance of protecting family and significant others were associated with reductions in HIV sexual risk behaviors. Meta-regression analyses indicated that the most robust intervention component is the provision/referral of medical services. Findings indicate that HIV interventions for heterosexual African American men might be more efficacious if they incorporated a range of health care services rather than HIV/STI-related services alone.

## Keywords

HIV intervention; African; American; Heterosexual; Meta-analysis Men

## Introduction

African Americans have a disproportionately high rate of HIV infections via sexual contact in the US [1]. Among U.S. males, African Americans account for 63% of HIV transmissions through high-risk heterosexual contact compared to 13% whites and 21% Hispanics [1]. In addition, nearly half of the recent HIV cases among African American females (44%) are attributed to high-risk heterosexual contact [1]. Since the majority of sex partner networks are intra-racial [2, 3], interventions designed to reduce risky sexual behaviors among heterosexual African American men have great potential to substantially reduce HIV infection in the entire African American community. For our paper, we operationalize heterosexual African American men as African American men who report having sex with women.

Incorporating factors that influence HIV sexual risk behaviors of heterosexual African American men is critical to the efficacy of HIV behavioral interventions for this at-risk population [4]. One important factor is *machismo* [5]. Machismo is an ideology present in the African American community [5, 6] (as well as others [7, 8]) that emphasizes perpetual male dominance over females and is characterized by an overemphasis in male sexual prowess, female subordination, and heterosexuality [5–8]. Black men who conform to this ideology are less motivated to engage in safer behavior and are more likely to adopt negative attitudes toward condom use [5], engage in inconsistent condom use, and have multiple sex partners [9–11]. Although measured in various ways [12], men who adhere to a traditional gender role are more likely to show behavioral traits consistent with machismo. On the other hand, machismo may integrate traditional roles that emphasize the importance of men as heads of families and related responsibilities to protect partner and family [6]. In this regard, machismo could help create a sense of responsibility to reduce HIV risk that is aligned with a sense of manhood [5]. This attitude may thus result in practicing behaviors that protect the

man and his sex partners. In other words, machismo may be a risk factor as well as a protective factor, depending on whether male dominance or responsibility is emphasized.

Some structural challenges may impede the ability of heterosexual African American men to maintain the responsibilities to protect partner and self. Poverty, incarceration, and disparities in health care have been correlated with the risk of HIV infection [13–15]. African Americans are disproportionately affected by poverty [16, 17]; in turn, poverty has been correlated with disparity in health care insurance among African Americans compared with whites [17]. The rate of incarceration is also disproportionately high among African Americans. Incarceration reduces opportunities to earn income and thus limits opportunities to break out of the poverty cycle, which in turn affects health care [18, 19]. African American men are also more likely than white men to receive delayed diagnoses and treatment for chronic diseases (including HIV infection) [20–22].

Interventions to reduce risky sexual behaviors among African Americans have been evaluated in a few recently published meta-analyses [22–25]; however, none of these reviews specifically examined factors associated with intervention efficacy for heterosexual African American men. All of these meta-analyses pointed out the importance of intensive skills training to increase the ability to negotiate safer sex [22–25], especially for African American women [25]. For heterosexual African American men, who generally have more power in a relationship, skills for negotiating safer sex may be less influential than social (e.g., machismo) and structural factors (e.g., poverty, incarceration, health care access) on impacting one's HIV risk. Our review expands the scope of previously published meta-analyses by directly testing whether studies addressing social and structural factors that disproportionately impact African American men would be more efficacious in reducing HIV risk. We also examined factors derived from behavioral change theories (e.g., knowledge, attitude toward condom use, motivation, skills building) that may be associated with intervention effects for this high risk population.

## Methods

### Data Sources

We searched the Centers for Disease Control and Prevention's (CDC) HIV/AIDS Prevention Research Synthesis (PRS) project cumulative database of the HIV/AIDS and STI behavioral prevention research literature from June 2007 through May 2008 [26, 27] to locate reports of interventions, published during January 1988–May 2008. The PRS database was developed using a comprehensive search of five electronic bibliographic databases, including AIDSLINE (1988–2000), EMBASE, MEDLINE, PsycINFO, and Sociological Abstracts from 1988 through 2008. These searches were performed by two subject-expert librarians, who used standardized search terms (i.e., indexing terms and keywords) in 3 areas:

- a. HIV, AIDS, or STI
- b. Intervention evaluation
- c. Behavioral or biological outcomes

The reports had to have one search term in each of the three areas. We used the same constructs to manually search 35 journals that regularly publish HIV or STI prevention research. Additional auxiliary searches include checking citations posted on Malow's list (Robert M. Maslow, PhD, HIV Listserv, <http://www.robertmalow.org/>), reference lists of pertinent articles for relevant reports, and contacting authors for their upcoming publications.

## Study Selection

The inclusion criteria were as follows:

- U.S.-based behavioral intervention intended to reduce the sexual risk of HIV or STI transmission
- Controlled trial (randomized or nonrandomized; single-group designs were excluded)
- Reporting of at least one postintervention HIV/STI behavior outcome (i.e., unprotected vaginal or anal intercourse, inconsistent condom use) or biologic outcome (i.e., STI, HIV)
- Reporting data sufficient for effect size (ES) calculation
- Focus on the risk of heterosexual transmission
- Focus on African American men

The study criterion of focus on African American men had to be achieved by meeting one of the following conditions:

1. Sole focus on African American men
2. At least 50% of sample composed of African American men
3. Outcome data stratified for African American men

We excluded studies that were focused on men who have sex with men (MSM) (including participants self-identified as homosexual, bisexual, or transgender) or whose samples were composed of more than 50% MSM. In addition, we excluded community-level interventions that intend to reduce the HIV risk of an entire community because the focus and mechanisms (e.g., delivery through community saturation) are conceptually different than from those of individual- or group-level interventions that are intended to change individual's behaviors.

## Data Abstraction

Information from eligible interventions was independently abstracted by pairs of trained reviewers. The overall agreement among the trained reviewers is 96% with a kappa rate of 80%. Linkages among studies were identified to ensure that multiple citations describing a single intervention study were included in the coding, data abstraction, and analyses. Standardized coding forms were used to code each intervention for study information, participant characteristics, outcomes, intervention features, and methodological quality. If a

particular study did not report a characteristic, we coded that article as not having that characteristic.

The primary behavioral outcome measure was operationalized as (a) unprotected vaginal/anal sex, (b) condom use, (c) or indexes of sexual risk that included (a) or (b). The primary biologic outcome measure was operationalized as any reports of STI or HIV infection obtained through medical records or self-reports. The outcomes measures were selected because of their role in HIV transmission [28, 29]. In terms of intervention components, machismo was operationalized as protecting family/significant others and gender roles. Gender roles were defined as any intervention component or issue that directly involves the concept of gender norms, gender roles, masculinity, or femininity, such as gender empowerment issues, gender dynamics involved with practicing safer sex, or reaffirming a sense of manhood in the context of HIV risk reduction.

Three culture-specific components were included: (a) use of culture-specific materials (i.e., any statement related to the inclusion of materials reflective of the African American culture); (b) racially/ethnically matched deliverer (i.e., matching the participants and deliverer by race or ethnicity); and (c) deliverer trained in principles of cultural competency, defined as training to implement intervention components that are based on the cultural constructs of the target population [30].

Two gender-specific components were included: (a) use of gender-specific materials (i.e., any statement related to gender specificity or provision of materials tailored for men); and (b) gender-matched deliverer (i.e., matching participants and deliverer by gender).

Contextual factors included socioeconomic status, incarceration history, and health care issues. Socioeconomic status was captured by the use of two indicators: (a) focus on low-income persons or (b) percentage of participants with income below the federal poverty level (e.g., <\$10,000/year). Incarceration history was measured by using the proportion of the sample that reported ever being incarcerated. We constructed two health services related indicators: provision/referral of medical services and discussion of mental health topics. Provision/referral of medical services was coded “yes” for interventions offering the delivery or referral for *any* of the following services: (a) HIV/STI-related health care, (b) general health care (including mental health care), and (c) drug treatment. The discussion of mental health topics was coded yes if an intervention addressed depression, anger, stress, anxiety, or other mental health related topics.

Additional intervention components that are common constructs in behavior change theories (e.g., information-motivation-skills theory, social cognitive theory, reason action theory) were considered in this review including knowledge and information, attitude toward condoms, motivation, normative influence, and skills building. Four types of skills building were measured as intervention components: (a) condom-use skills, (b) negotiation skills relevant to safer sex/condom use, (c) decision-making/problem-solving skills, and (d) assertiveness (i.e., improve the ability to proactively pursue safer sex behaviors).

We coded the following variables of methodological quality: study design (i.e., randomized versus nonrandomized controlled trials), allocation method (e.g., sequence generation,

concealment, blinding), unit of assignment, retention rate, and intent-to-treat analysis (i.e., efficacy analysis was conducted based on original group assignment, regardless of participants' actual intervention exposure).

## Effect Size

Effect sizes were estimated with odds ratios because the odds ratio allows the estimated ES to be expressed in terms of relative odds of each outcome. For studies reporting means and standard deviations for continuous variable outcomes, standardized mean differences were calculated and then converted into odds ratio values [31]. An odds ratio of <1 indicates a reduction in odds of HIV sexual risk behavior or STI outcomes in the intervention group relative to the comparison group.

Standard meta-analytical methods were used [32]. For each study, we first used the natural logarithm to obtain log odds ratio ( $\ln$ OR) and calculated its corresponding weight (i.e., inverse variance). In estimating the overall ES, we multiplied each  $\ln$ OR by its weight, summed the weighted  $\ln$ OR of all studies, and then divided by the sum of the weights. The aggregated  $\ln$ OR was then converted back to odds ratio by exponential function, and a 95% confidence interval (95% CI) was derived. We also examined the magnitude of heterogeneity of ESs by using the  $Q$  statistic and Higgins's  $I^2$  index [33, 34]. We based our final presentation on the random-effects model because this method can provide a more conservative estimate of variance and is more appropriate than fixed-effect models when generalizing to a population of studies beyond those reviewed [35].

## Analytic Approach

We used the following rules to guide data abstraction for estimating the *overall* intervention effect.

- a. To meet the independence of ES assumption, we selected the intervention group that was most theoretically potent and the comparison group that was least potent (typically a standard of care or a wait-list control). Multiple ESs were calculated from individual studies if more than one relevant outcome was provided. Aggregated analyses were conducted for HIV sexual risk behavior and STI outcomes separately. The ESs and variance were averaged within a study for the HIV sexual risk behavior analyses if both unprotected sex and condom use outcomes were reported. We calculated the ES by adjusting for baseline differences between the intervention and comparison groups in cases when adjusted data were not reported [36].
- b. We established a hierarchical selection criterion for studies reporting multiple assessments. We used the 3-month post-intervention follow-up for HIV sexual risk behavior outcomes and the 6-month post-intervention follow-up for STI outcomes as the priority assessments
- c. We conducted sensitivity analyses to determine whether the overall results were sensitive to the aforementioned rules for guiding ES calculation. The aggregated ES estimate was compared with the estimate obtained after we excluded an outlier study that might influence the results. Another sensitivity test compared

the aggregated effect with the ES of the 7 studies that included both HIV sexual risk behaviors and STI outcomes. Lastly, we examined whether overall results were sensitive to the 2 studies [37, 38] whose samples comprised approximately 20% MSM.

Between-group analyses were conducted to determine whether methodological quality; study or sample characteristics; or intervention features were associated with ESs. We assessed the between-group differences using the mixed-effects model [39] with the Comprehensive Meta-Analysis software, version 2. Variables significantly associated ( $P < 0.05$ ) with intervention efficacy on the basis of the mixed-effects model were entered into a multivariate random-effects meta-regression model by using STATA version 9 with the “meta-reg” command.

Publication bias was assessed by visual inspection of funnel plots [40] and Egger’s regression [41] (a linear regression test that compares the standardized ES estimates with the precision [the inverse of the standard error] of each study). To reduce the likelihood of other biases, we performed other procedures consistent with the best practices associated with methodologically sound meta-analysis [42].

## Results

### Study Samples, Intervention Characteristics, and Methodological Quality

Our review included 44 studies (Fig. 1; Tables 1, 2) comprising 22,105 participants. The median age of participants was 34. Of the 44 studies, 14 stratified data by gender and race, seven focused on African American men, 14 focused on illicit drug users, and six focused on participants with a history of incarceration.

Interventions typically were delivered in small groups ( $k = 30$ , 68%), consisting of a maximum of 3 sessions ( $k = 23$ , 52%) and lasting a maximum of 6 h ( $k = 23$ , 52%). The predominant intervention settings were STI clinics ( $k = 12$ , 27%), followed by community-based organizations ( $k = 7$ , 16%), correctional facilities ( $k = 6$ , 14%), and other health care settings ( $k = 6$ , 14%). The interventions were delivered by trained facilitators ( $k = 22$ , 50%) or educators ( $k = 18$ , 41%).

Of the 44 studies, 34 used one or more behavioral theories. Nearly three-fourths reported the inclusion of at least one cultural or gender-relevant feature: 10 used culturally specific materials, and nine used racially matched deliverers; 11 used gender-matched deliverers, and nine used gender-specific materials. Nearly two-thirds of interventions included skills building in HIV/STI risk reduction: condom use ( $k = 24$ ); negotiation of safer sex/condoms ( $k = 21$ ); and decision-making/problem-solving ( $k = 17$ ). Five interventions (11%) reported one or more types of provision/referral of medical services, which included drug treatment ( $k = 4$ ), other general health care (including mental health care) ( $k = 4$ ), or HIV/STI-related care ( $k = 1$ ).



## Overall Effect Sizes: HIV-Risk Sex Behavior and STI Outcomes

The aggregated ES of the 40 studies that reported any HIV sexual risk behavior was statistically significant (OR = 0.79; 95% CI = 0.69, 0.89,  $N = 20,934$ , Table 1).  $Q$  test and  $I^2$  indicated heterogeneity among studies reporting HIV sexual risk behavior outcomes ( $Q_{39} = 67.74$ ,  $P < 0.003$ ;  $I^2 = 42.42$ ) and further examination of heterogeneity is described under between-group analyses below.

For the STI outcomes, the aggregated ES of 11 studies was also statistically significant (OR = 0.74; 95% CI = 0.63, 0.87,  $N = 14,592$ ; Table 1).  $Q$  test and  $I^2$  did not indicate heterogeneity among studies reporting STI outcomes ( $Q_{10} = 12.60$ ,  $P = 0.25$ ,  $I^2 = 20.62$ ). Because of the lack of heterogeneity and a small number of studies, we did not conduct between-group analyses for the meta-regression analysis for STI outcomes (Figs. 2, 3).

## Sensitivity Analyses

No single study influenced the overall ES for each outcome. We compared the ES estimates of seven studies that reported both HIV sexual risk behavior and STI outcomes with the overall HIV sexual risk behavior ES and STI effect size estimates. The results were comparable (HIV sexual risk behavior outcomes: OR = 0.87, 95% CI = 0.74, 1.03,  $P = 0.11$ ,  $k = 7$ ; STI outcomes: OR = 0.76, 95% CI = 0.61, 0.94,  $P = 0.01$ ,  $k = 7$ ). For HIV sexual risk behaviors, the effect size was comparable to the overall ES even when we excluded 2 studies with samples of ~20% MSM (OR = 0.81, 95% CI = 0.71, 0.92,  $k = 38$ ) (neither study reported STI outcomes). The ES for HIV sexual risk behaviors changed only slightly when we excluded studies that targeted drug users (OR = 0.77, 95% CI = 0.67, 0.90,  $k = 26$ ).

## Publication Bias

On the basis of the linear regression test [41], we found evidence of publication bias for the 40 studies that reported any HIV sexual risk behavior ( $t = 2.45$ ,  $P = 0.019$ ). The funnel plot was asymmetrical, suggesting fewer studies with negative intervention effects and large variance (figure not shown). We did not find evidence of publication bias for the 11 studies that provided STI outcomes ( $t = 1.616$ ,  $P = 0.141$ ).

## Between-Group Analyses for HIV-Risk Sex Behaviors

For HIV sexual risk behavior outcomes, efficacy was significantly greater (see Table 1) among interventions focused on African Americans, African American men, and men with incarceration history, as well as interventions that used gender-matched deliverers, addressed the protection of family and significant others, or provision/referral of medical services including general health care, drug treatment, or any provision/referral of medical services (HIV/STI, general health, drug treatment) (for all characteristics,  $P < 0.05$ ). Additionally, studies with a shorter follow-up showed a larger intervention effect than studies with a longer follow-up (>2 months).

## Findings of Meta-Regression Analysis of HIV-Risk Sex Behaviors

For HIV sexual risk behaviors, we conducted a multivariate random-effects meta-regression analysis to test for independent effects of the significant sample or intervention



characteristics identified. The three provision/referral of medical services types (HIV/STI treatment, general health care, including mental health care, and drug treatment) were highly correlated with each other (Pearson  $r$ 's ranged from 0.72 to 0.88). To avoid multicollinearity among those variables, we used a composite measure of any provision/referral of medical services. We entered five additional predictors (based on the bivariate analyses): focused on African American men, men with incarceration history, length of follow-up period, gender-matched deliverer, and the protection of family/significant others. Provision/referral of medical services (coefficient =  $-0.53$ ,  $SE = 0.28$ ,  $z = -1.90$ ,  $P = 0.07$ ) emerged as the strongest independent predictor of intervention efficacy. We suspect that the marginal statistical significance of this variable was due in part to the moderate correlation between history of incarceration and provision/referral of medical services ( $r = 0.672$ ,  $P < 0.001$ ). When we removed incarceration history from the meta-regression equation, provision/referral of medical services emerged as a predictor with high statistical significance (coefficient =  $-0.55$ ,  $SE = 0.23$ ,  $z = -2.46$ ,  $P = 0.02$ ).

## Discussion

This meta-analysis is the first to focus on heterosexual African American men. Similar meta-analyses [22–24], despite their focus on African Americans, did not stratify results by this high risk population. In addition, our meta-analysis directly tested the effects of interventions that addressed social and structural issues (e.g., gender roles and provision/referral of medical services) on HIV sexual risk behaviors. Like other meta-analyses, we also found that, in general, interventions can be efficacious in reducing HIV sexual risk behaviors and STI outcomes among heterosexual African American men.

Compared with a recent meta-analysis of African American women [25], the HIV interventions in our meta-analysis were slightly less efficacious in reducing HIV sexual risk behaviors among heterosexual African American men (men: OR = 0.79; 95% CI = 0.69, 0.89,  $N = 20,934$ ; women: OR = 0.63; 95% CI = 0.54, 0.75;  $N = 11,239$ ). The intervention effects on STI outcomes were comparable in both reviews (men: OR = 0.76; 95% CI = 0.64, 0.89,  $N = 14,592$ ; women: OR = 0.81; 95% CI = 0.67, 0.98;  $N = 8,760$ ). It is encouraging that interventions with heterosexual African American men can achieve reductions in HIV sexual risk behaviors and STI outcomes similar to those achieved by interventions with African American women.

As we hypothesized, skills-building for promoting safer sex negotiation was not critical in influencing African American men's risk behaviors, which contrast the meta-analytic findings for African American women [25]. In the context of power dynamics in heterosexual relationships, the communication skill may be more important for women than men because women are often in subordinate power positions in relation to their male partners [6]. Another important theme that emerges from the findings is the association of increased efficacy with intervention features related to protecting family/significant others, suggesting that framing HIV prevention messages in the context of protecting family and significant others can motivate heterosexual African American men to reduce HIV sexual risk behaviors. In this regard, machismo may help encourage a sense of responsibility to reduce HIV risk that is aligned with their sense of manhood [5].

Poverty rates are disproportionately high among African American men and African American women [17, 43]. Although we coded the income and poverty level of the participants, none of the interventions we reviewed were specifically designed to address poverty issues. Recently, the use of financial empowerment strategies (e.g., microfinance) as an HIV prevention strategy [44] has received increased attention. However, many microfinance interventions are focused on women and emphasize gender inequality and empowerment. Given that many heterosexual African American men also struggle with low socioeconomic status, a microfinance strategy to empower these men seems worthy of consideration.

Provision/referral of medical services was the intervention component most strongly associated with efficacy in reducing HIV sexual risk behavior among heterosexual African American men. This finding is consistent with the findings of other reports demonstrating the benefit of using a comprehensive health care approach in implementing HIV behavioral prevention interventions [18, 19], especially when the disease is stigmatized or when people have limited access to care. Given that African American men have disproportionately less health care insurance [17] and are more likely to receive health care from providers with less training compared to whites [43], a more holistic health promotion approach that includes HIV prevention may be more likely to be effective in reducing HIV sexual risk behavior among these men. However, our findings revealed that most of the interventions that provide some form of health care services targeted African Americans with an incarceration history. Therefore, we caution public health researchers to conduct sufficient formative work when developing or adapting these components for interventions that target African American men with no incarceration history.

Several limitations warrant comment. First, our focus on heterosexual African American men means that the selection of studies hinged substantially on the accuracy and detail of the published reports. Many of the studies reported only sex and racial demographics; that is, they gave no information regarding sexual orientation. Others reported sexual orientation or identity but did not assess whether heterosexually identified participants engaged in any same-sex activity. Thus, our analyses may have included African American men who engaged in same-sex activity but who did not identify themselves as gay. Second, we did not conduct an extensive search in the grey literature (e.g., dissertations, conference abstracts, unpublished reports). Third, we used odds ratio as the indicator of ES. Despite the advantages of using odds ratios as a summary statistic in a meta-analysis, odds ratios cannot be used to compare populations whose risk factors differ at baseline [45, 46]. Evidence of efficacious intervention components was based on HIV risk behavior outcomes. Therefore, we cannot make generalizations that the efficacious intervention components identified in this meta-analysis also affect biological outcomes. While it is encouraging that behavioral interventions, as a whole, do reduce STIs among heterosexual African American men, more studies are needed to further examine the efficacious intervention components for impacting biological outcomes.

Another limitation is that the assessment of several variables was likely affected by reporting issues. The reported conceptual or operational definitions of cultural element indicators, in particular, were inconsistent or limited. Furthermore, there is also the possibility that some

of cultural elements included in the interventions were not included in the published report. These reporting issues made it difficult to assess both the quantity and quality of the cultural elements incorporated in the interventions. Therefore, making generalizations across these studies would be extremely challenging.

## Conclusion

The interventions in our meta-analysis were efficacious in reducing HIV sexual risk behaviors and STIs among heterosexual African American men; the interventions for African Americans in general and men with incarceration history were even more efficacious. The most efficacious HIV behavioral interventions incorporated other health care services rather than providing HIV/STI prevention alone. In addition, the protection of family and significant others is a component that contributes to intervention efficacy. Development of strategies targeting heterosexual African American men should include interventions that best incorporate the aforementioned components to maximize prevention efficacy and effectiveness.

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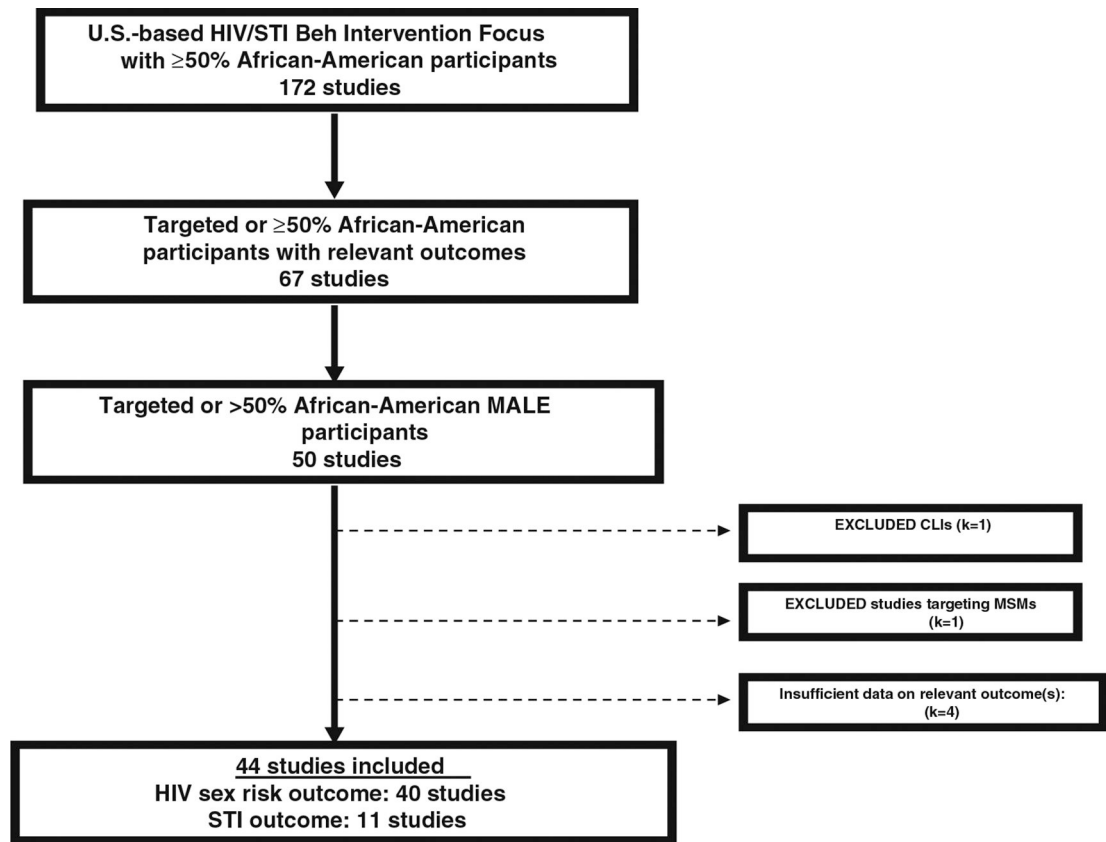
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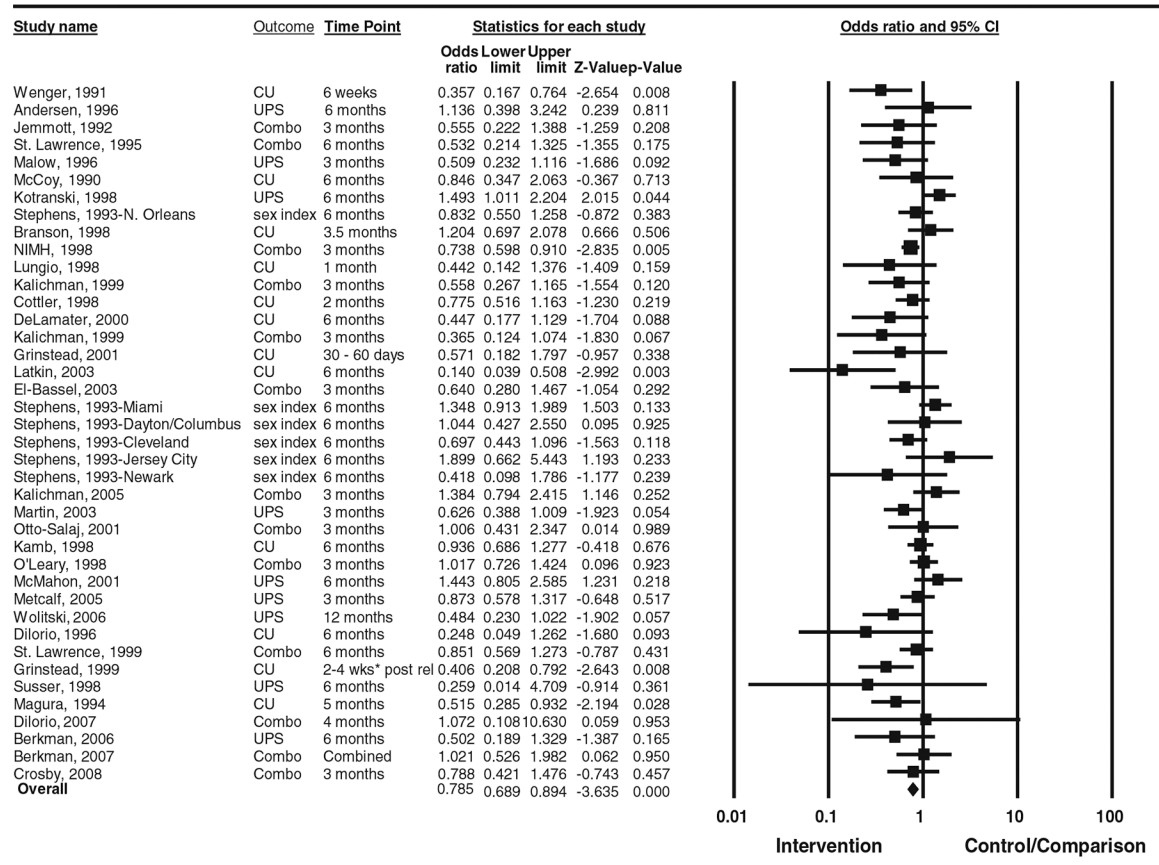


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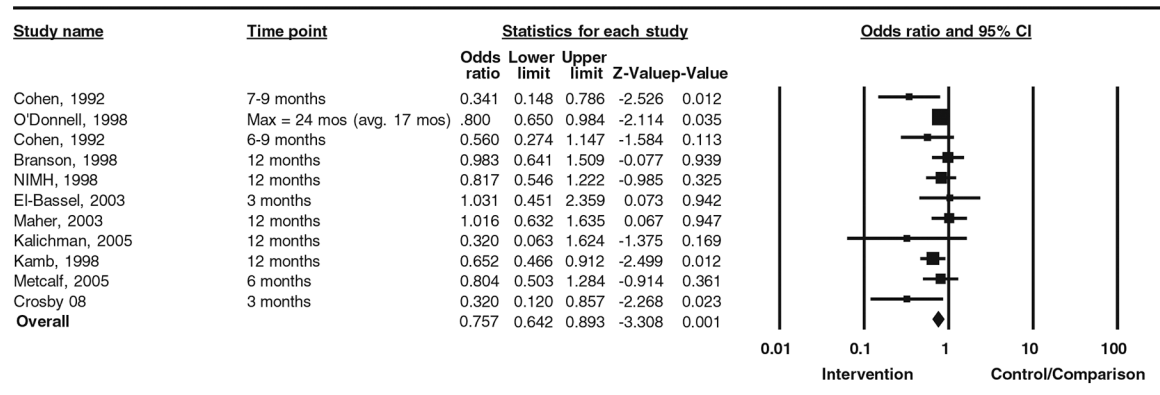




**Fig. 1.**  
Trial selection process for meta-analytic review of HIV/STI behavioral interventions for African-American males (January 1988–May 2008)

**Fig. 2.**

Study specific and overall ES estimates (40 trials) of HIV sexual risk behavior outcomes for behavioral interventions targeting heterosexual African American men. *Note.* “Combo”-combined effect size of condom use (CU), unprotected sex (UPS), and author-defined HIV-risk behavior index (sex index) within a study. The *boxes* represent study weights (inverse variance of random-effects model)



**Fig. 3.** Study specific and overall ES estimates (11 trials) of STIs outcomes for behavioral interventions targeting heterosexual African American men. Note. The *boxes* represent study weights (inverse variance of random-effects model)

**Table 1**

Summary of stratified analyses for individual-level and group-level interventions for reducing HIV sexual risk behavior among heterosexual African American males

	<i>k</i>	<b>OR</b>	<b>Lower 95%</b>	<b>Upper 95%</b>	<i>I</i> <sup>2</sup>	<i>Q</i> <sub>B</sub>	<i>P</i> value
Overall	40	0.79	0.69	0.89	42.42	67.74	0.003 **
Sample characteristics							
Target African Americans							
Yes	9	0.51	0.38	0.68	0.00	9.95	0.002 **
No	31	0.85	0.75	0.97	39.31		
Target males							
Yes	18	0.71	0.58	0.88	37.76	1.22	0.27
No	22	0.83	0.70	0.99	46.87		
Target African American males							
Yes	6	0.56	0.41	0.78	0.00	4.20	0.04 *
No	34	0.82	0.71	0.94	45.24		
Target youth							
Yes	7	0.64	0.49	0.85	0.00	2.23	0.14
No	33	0.82	0.71	0.94	46.28		
Target drug users							
Yes	14	0.82	0.63	1.06	58.54	0.13	0.71
No	26	0.77	0.67	0.89	29.37		
Target low income							
Yes	5	0.57	0.26	1.22	58.98	0.72	0.40
No	35	0.79	0.69	0.91	41.32		
Target incarceration history							
Yes	7	0.58	0.43	0.78	60.41	4.91	0.03 *
No	33	0.84	0.74	0.97	39.06		
Intervention features							
Formative research conducted							
Yes	14	0.72	0.60	0.87	25.02	1.20	0.27
No	26	0.83	0.70	0.99	47.11		
Culture-specific materials							
Yes	8	0.82	0.61	1.11	53.14	0.14	0.70
No	32	0.77	0.66	0.90	41.28		
Gender-specific materials							
Yes	8	0.73	0.56	0.95	26.00	0.32	0.57
No	32	0.79	0.68	0.92	44.73		
Ethnically matched deliverer							
Yes	7	0.71	0.59	0.85	0.00	0.92	0.34
No	33	0.80	0.69	0.93	47.66		
Gender-matched deliverer							

	<i>k</i>	<b>OR</b>	<b>Lower 95%</b>	<b>Upper 95%</b>	<i>I</i> <sup>2</sup>	<i>Q</i> <sub>B</sub>	<i>P</i> value
Yes	8	0.66	0.56	0.78	0.00	4.33	0.03 *
No	32	0.84	0.72	0.98	42.49		
Gender roles							
Yes	2	0.73	0.60	0.90	0.00	0.31	0.58
No	38	0.78	0.68	0.91	43.98		
Motivation/intention							
Yes	18	0.81	0.68	0.95	29.11	0.17	0.68
No	22	0.76	0.62	0.94	51.99		
Knowledge/information							
Yes	10	0.66	0.53	0.83	0.00	2.30	0.13
No	30	0.82	0.71	0.95	49.20		
Protecting significant others/family							
Yes	8	0.59	0.45	0.77	10.32	5.25	0.02 *
No	32	0.84	0.73	0.96	40.94		
Positive attitude toward condom use							
Yes	5	0.82	0.63	1.08	45.35	0.19	0.66
No	35	0.77	0.66	0.90	43.65		
Normative influence							
Yes	4	0.61	0.30	1.26	74.06	0.46	0.50
No	36	0.79	0.69	0.90	37.30		
Skill-correct condom use							
Yes	21	0.86	0.74	0.99	31.21	2.11	0.15
No	19	0.70	0.55	0.88	51.35		
Skill-safer sex negotiation skills							
Yes	18	0.83	0.71	0.97	34.91	0.72	0.40
No	22	0.73	0.60	0.91	0.04		
Skill-assertiveness skills							
Yes	4	0.73	0.60	0.89	0.00	0.30	0.58
No	36	0.78	0.68	0.91	46.07		
Skill-decision-making/problem-solving skills							
Yes	17	0.76	0.64	0.90	28.86	0.23	0.63
No	23	0.80	0.66	0.98	48.81		
Provision/referral of med serv.-HIV/STI care							
Yes	1	0.57	0.18	1.80	0.00	0.30	0.59
No	39	0.79	0.69	0.90	43.57		
Provision/referral of med serv.-general health							
Yes	4	0.44	0.28	0.70	15.70	6.69	0.01 *
No	36	0.83	0.73	0.94	36.75		
Provision/referral of med serv-drug treatment							
Yes	4	0.42	0.28	0.62	11.59	10.91	0.0009 **
No	36	0.84	0.75	0.95	31.49		

	<i>k</i>	OR	Lower 95%	Upper 95%	<i>I</i> <sup>2</sup>	<i>Q</i> <sub>B</sub>	<i>P</i> value
Provision/referral of med serv (HIV/STI txt, general health, drug txt)							
Yes	5	0.44	0.31	0.62	0.00	12.25	0.0004**
No	35	0.85	0.75	0.96	32.81		
Mental health issues (stress, anxiety, anger, depression)							
Yes	7	0.92	0.75	1.14	2.15	2.42	0.12
No	33	0.75	0.65	0.88	46.70		
No. of intervention sessions							
1	11	0.77	0.57	1.04	57.41	1.73	0.63
2–5	11	0.94	0.73	1.22	59.53		
6	14	0.76	0.61	0.95	30.14		
Nr	4	0.81	0.54	1.21	33.88		
Duration (min)							
60	5	0.84	0.60	1.18	48.98	0.10	0.99
61–360	15	0.81	0.66	1.00	47.39		
361	13	0.84	0.65	1.09	48.01		
Nr	7	0.79	0.47	1.32	68.53		
Study design							
Randomization							
Yes	34	0.80	0.70	0.92	44.22	0.43	0.51
No	6	0.68	0.42	1.09	30.07		
Retention (%)							
70	22	0.77	0.64	0.93	48.08	0.15	0.92
<70	4	0.75	0.48	1.17	32.89		
Nr	14	0.81	0.64	1.02	42.44		
Power reported							
Yes	8	0.81	0.70	0.93	0.00	0.20	0.59
No	32	0.76	0.64	0.90	49.18		
Intent to treat analysis							
Yes	40	0.78	0.69	0.89	42.42	0.00	1.00
No	-	-	-	-			
Longest follow-up times (months)							
2	4	0.41	0.27	0.63		9.29	0.002**
>2	36	0.83	0.73	0.94			

\*  $P < 0.05$ ;

\*\*  $P < 0.01$

Summary of HIV behavioral interventions for heterosexual African American men included for meta-analysis

Table 2

Author	Date	Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
Andersen et al.	1996 [47]		Recruitment Public area/community Intervention Project offices Sample N = 539, 67% AA male	1 comparison group (standard care), 1 intervention group (Personalized Nursing LIGHT Project) Assignment: Random Unit of delivery: Group (via zip codes)	Comparison group: Standard of care Intervention group components: HIV knowledge, social support, self-esteem, HIV/STI related care, personalized risk reduction plan, cleaning needles Cultural & gender relevancy: None reported	Assessments Baseline and 6-month follow-up Findings Reduced UPS
Berkman et al.	2006 [48]		Recruitment Community-Based Establishment Intervention Community Sample N = 92, 65% AA male	1 comparison group (HIV education group), 1 intervention group (SexG-Brief Group) Assignment: Random Unit of delivery: Group	Comparison group: HIV education & condom use skills Intervention group components: HIV/STD knowledge/information, motivation/intention, condom use skills, decision-making & problem solving, safer sex negotiation skills Cultural & gender relevancy: None reported	Assessments Baseline and 6-month follow-up Findings Reduced UPS
Berkman et al.	2007 [49]		Recruitment Psychiatric Clinic Intervention Psychiatric Clinic Sample N = 149, 54% AA male	1 comparison group (attention control), 1 intervention group (Enhanced SexG + booster Group) Assignment: Random Unit of delivery: Individual	Comparison group: Money management, social skills Intervention group components: HIV&STD knowledge/information, motivation/intention, normative influence, condom use skills, decision-making/problem solving personal goals Cultural & gender relevancy: Gender matched facilitators	Assessments Baseline and 3-, 6-, 9-, and 12-month follow-ups (plus boosters.) Findings Reduced UPS Increased condom use
Branson et al.	1998 [50]		Recruitment STD Clinic Intervention STD Clinic Sample N = 964, 50% AA male	1 comparison group (standard care), 1 intervention group (multisession group counseling) Assignment: Random Unit of delivery: Group	Comparison group: HIV counseling and testing Intervention group components: HIV knowledge/information, motivation to protect oneself and others, empowerment, personal responsibility, self-esteem, decision-making skills, condom use skills, needle-cleaning skills Cultural & gender relevancy: None reported	Assessments Baseline and 12-month follow-up Findings Condom use similar in both intervention and control groups Reduced new STIs Lowered similarly in both interv and comparison group
Cohen et al.	1992 [51]		Recruitment STD clinic Intervention STD Clinic Sample N = 426, 65% AA male	1 comparison group (standard care), 1 intervention group (group counseling) Assignment: Non-random (time of day)	Comparison group: Routine care Intervention group components: HIV knowledge/information, safer-sex negotiation skills, condom-use skills	Assessments Baseline and 7-9 month follow-up Findings Lower rate of new STIs



Author Date Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
Cohen et al., 1992 [52]	Recruitment STD clinic Intervention STD Clinic Sample (stratified data) N= 196, 100% AA male	Unit of delivery: Group  1 comparison group (wait-list), 1 intervention group (Condom skills program for men) Assignment: Non-random Unit of delivery: Group	<i>Cultural &amp; gender relevancy:</i> Ethnic and gender matching of facilitator (females only)  <i>Comparison group:</i> Wait-listed <i>Intervention group components:</i> HIV knowledge/information, condom-use skills <i>Cultural &amp; gender relevancy:</i> Ethnic and gender matching of facilitator (females only)	No differences were found among women.  Assessment Baseline and follow-up at 7–9 months <i>Findings:</i> Lower rate of new STIs
Cottler et al., 1995 [53]	Recruitment Public area/community Intervention Storefront Health Centers Sample (stratified data) N= 341, 100% AA male	1 comparison group (HIV/AIDS materials, HIV C&T), 1 intervention group (Peer-delivered intervention) Assignment: Random Unit of delivery: Individual	<i>Comparison Group:</i> HIV/AIDS materials, HIV C&T <i>Intervention components:</i> HIV knowledge, stress management, drug awareness (delivered via peer counseling) <i>Cultural &amp; gender relevancy:</i> None reported	Assessment Baseline and 2-month follow-up <i>Findings:</i> Increased condom use past 30 days
Crosby et al., 2009 [54]	Recruitment STD Clinic Intervention STD Clinic Sample N= 266, 100% AA male	1 comparison group: (standard care), 1 intervention group (Lay Health Advisor) Assignment: Random Unit of delivery: Individual	<i>Comparison group:</i> Nurse-delivered messages regarding condom use knowledge, access to condoms <i>Intervention group components:</i> Addresses knowledge/information; motivation/intention; self-efficacy for condom use, correct condom use skills, lubrication use, access to condoms and lubrication <i>Cultural &amp; gender relevancy:</i> Ethnic-matched facilitator, culturally-competent facilitator, gender-matched facilitator	Assessments Baseline and 3-month follow-up <i>Findings:</i> Lower rate of new STIs Increased condom use (at last sex) No significant differences in UPS during last 3 months
Delamater et al., 2000 [55]	Recruitment STD clinic Intervention STD Clinic Sample N= 312, 100% AA male	1 comparison group (standard care), 1 intervention group (video intervention) Assignment: Random Unit of delivery: Individual	<i>Comparison group:</i> Education program <i>Intervention group components:</i> HIV knowledge/intention, motivation/intention, protecting community, personal risk/vulnerability, condom-use skills <i>Cultural &amp; gender relevancy:</i> Ethnic-matched facilitator	Assessments Baseline and 6-month follow-up <i>Findings:</i> Increased condom use past 30 days
Dilorio et al., 2006 [56]	Recruitment Community based establishment Intervention Community Sample N= 93, 58% AA male	1 comparison group (HIV information and discussion), 1 intervention group (“Keepin’ It Real”) Assignment: Random Unit of delivery: Group	<i>Comparison group:</i> HIV knowledge and discussion <i>Intervention group components:</i> HIV knowledge, attitude towards sexual values and behavior, self-efficacy, correct condom use, assertiveness skills, decision-making/problem-solving skills, parent-child; communication skills, social support, personalized risk reduction plan	Assessments Baseline and 6-month follow-up (after booster) <i>Findings:</i> Increased condom during last sex (past 30 days)

Author Date Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
Diliorio et al., 2007 [57]	<i>Recruitment</i> Community-based establishment <i>Intervention</i> Not reported <i>Sample</i> N = 273, 96% AA male	1 comparison group (attention control), 1 intervention group ("Real Men") Assignment: Random Unit of delivery: Group	<i>Culture &amp; gender relevancy:</i> None reported  <i>Comparison group:</i> Nutrition and exercise <i>Intervention group components:</i> HIV knowledge, motivation/intention, attitude toward parent-child communication about HIV, listening and communication self-efficacy, social support, discuss emotional issues associated with adolescent development, developing personal goals, discuss peer pressure, parental monitoring <i>Culture &amp; gender relevancy:</i> Gender appropriate materials	<i>Assessments</i> Baseline and 3-, 6-, 12-month follow-up <i>Findings</i> Higher condom use at first sex Reduced UPS
El-Bassel et al., 2003 [58]	<i>Recruitment</i> Clinic (hospital-based) <i>Intervention</i> Clinic (hospital-based) <i>Sample</i> N = 434 (217 couples), 55% AA, 50% male	1 comparison group: (Education), 2 intervention groups: (Couples, Women only) Assignment: Random Unit of delivery: Group	<i>Comparison group:</i> HIV/STD education (video) <i>Intervention group components</i> ("Project Connects"): Communication skills, safer-sex negotiation skills, problem-solving skills <i>Culture &amp; gender relevancy:</i> Gender matched facilitators	<i>Assessments</i> Baseline and 3-month follow-up <i>Findings</i> Increased protected sex acts Reduced UPS No differences found between two intervention groups No significant difference in STD symptoms
Grinstead et al., 2001 [59]	<i>Recruitment</i> Correctional <i>Intervention</i> Correctional <i>Sample</i> N = 414, 51% AA male	1 comparison group (standard care), 1 intervention group (Pre-release HIV Prevention Intervention) Assignment: Random Unit of delivery: Individual	<i>Comparison group:</i> Access to HIV educational materials, informal access to peer educators <i>Intervention group components:</i> Addresses personal risk, personalized risk reduction plan, and HIV knowledge, HIV testing referrals, needle exchange <i>Culture &amp; gender relevancy:</i> Gender matched facilitator (male)	<i>Assessments</i> Baseline and 2-4 week follow-up <i>Findings</i> Increased condom use during first sex
Grinstead et al., 1999 [37]	<i>Recruitment</i> Correctional <i>Intervention</i> Correctional <i>Sample</i> N = 185, 50% AA male	1 comparison group (Standard care), 1 intervention group (peer-led intervention) Assignment: Random Unit of delivery: Individual	<i>Comparison group:</i> Access to HIV educational materials, informed access to peer educators & consultation with staff <i>Intervention group components:</i> HIV knowledge/information, HIV testing referrals, needle exchange, drug treatment, personal risk/vulnerability, personalized risk reduction planning <i>Culture &amp; gender relevancy:</i> Gender-matched deliverer	<i>Assessments</i> Baseline and 2-4 weeks follow-up (post-release) <i>Findings</i> Increased condom use during first sex
Jemmott et al., 1992 [60]	<i>Recruitment</i> Community-based establishment, health care clinic	1 comparison group (non-HIV intervention), 1	<i>Comparison group:</i> Career planning, analysis, and opportunities	<i>Assessment</i> Baseline and 3-month follow-up

Author Date Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
	<i>Intervention</i> Educational setting (local school on Saturdays) <i>Sample</i> N= 57, 100% AA male	intervention group (AIDS Risk Reduction Intervention) Assignment: Random Unit of delivery: Group	<i>Intervention group components:</i> HIV knowledge/information, motivation/intention, attitude toward sexual risk behavior and HIV/AIDS, self-esteem, condom use and abstinence self-efficacy, condom use skills, safer sex negotiation, impulse control, and condom availability skills	<i>Findings</i> Reduced UPS Increased condom use
Kalichman et al., 1999 [38]	<i>Recruitment</i> STD Clinic <i>Intervention</i> STD Clinic <i>Sample</i> N= 117, 100% AA male	1 comparison group (standard care), 1 intervention group ("Project Nia") Assignment: Random Unit of delivery: Group	<i>Comparison group:</i> HIV prevention information, HIV Counseling and Testing, condom discussion <i>Intervention group components:</i> Personal risk reduction plan, HIV knowledge/information, motivation to protect oneself and others, self-esteem, condom use skills, assertiveness skills, problem-solving skills, safer sex negotiation skills <i>Cultural &amp; gender relevancy:</i> Culturally and gender specific materials, Gender-matched facilitators	<i>Assessments</i> Baseline and 3-, 6-month follow-up <i>Findings</i> Reduced UPS Increased condom use
Kalichman et al., 1999 [61]	<i>Recruitment</i> STD Clinic <i>Intervention</i> Community <i>Sample</i> N= 67, 100% AA male	1 comparison group (Standard care), 1 intervention group (Polyurethane condom use skills) Assignment: Non-Random Unit of delivery: Group	<i>Comparison group:</i> Access to HIV educational video and group discussion <i>Intervention group components:</i> HIV knowledge/information, motivation/intention, condom use skills, decision making/problem solving <i>Cultural &amp; gender relevancy:</i> Ethnic and Gender-matched facilitators.	<i>Assessments</i> Baseline and 3-month follow-up <i>Findings</i> Increased condom use
Kalichman et al., 2005 [62]	<i>Recruitment</i> STD Clinic <i>Intervention</i> STD Clinic <i>Sample</i> N= 612, Approx. 59% AA male	1 comparison group, 3 intervention groups: (a- Motivational enhancement, b-Behavioral self-management and sexual communication, c-Full IMB model) Unit of delivery: Group Unit of delivery: Individual	<i>Comparison group:</i> HIV education about transmission, risk factors, and disease processes) Intervention groups components (four groups) <i>Motivational enhancement:</i> Emphasizes personal behavioral change based on personal responsibility <i>Behavioral self-management and sexual communication:</i> Emphasize strategies to reduce high risk behavior and communicating safe sex practices with partner <i>Full IMB model:</i> Includes all components listed above. <i>Video:</i> used as part of intervention delivery <i>Cultural &amp; gender relevancy:</i> Culturally and gender specific materials, Gender-matched facilitators	<i>Assessments</i> Baseline and 3-, 6-, 9-month follow-up <i>Findings</i> Lower new STIs Reduced UPS

Author Date Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
Kamb et al., 1998 [63]	<i>Recruitment</i> STD Clinics <i>Intervention</i> STD Clinic <i>Sample</i> N = 5758, 59% AA, 57% male, Assignment: Block randomization (computer-generated)	1 comparison group (Routine HIV/STD information), 2 intervention groups: (Enhanced counseling, Brief counseling) Assignment: Random Unit of delivery: Group	<i>Comparison groups:</i> Typical STD clinic didactic messages promoting consistent condom use with all partners <i>Intervention group components:</i> Same as above and adding... <i>Enhanced counseling:</i> Information to encourage changes in self-efficacy, attitude, perceived norms about condom use. Goals for reducing risk were developed for each participant Intervention based on theory of reason action and social cognitive theory <i>Brief counseling:</i> Information to assess actual and self-perceived HIV/STD risk and develop risk reduction plan (modeled after CDC plan) <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 3, 6, 9, 12-month follow-up <i>Findings:</i> Increased condom use. Shown between comparison and intervention groups at 3-month, less pronounced at 6-month; no differences at 9, 12-month. Decreased reporting of new STIs between comparison and intervention groups-no differences between two intervention groups
Korranski et al., 1998 [64]	<i>Recruitment</i> Public area/community <i>Intervention</i> Field Office <i>Sample</i> N = 595, 48.6% AA men (stratified)	1 comparison group (HIV risk reduction education, HIV C&T, drug treatment, needle cleaning), 1 intervention group (enhanced HIV counseling intervention)	<i>Comparison group:</i> HIV risk reduction education, HIV C&T, drug treatment referrals, needle cleaning, medical and social support <i>Intervention group components:</i> Condom use skills, personal risk vulnerability, all comparison group components (HIV risk reduction education, HIV C&T, drug treatment referrals, needle cleaning, medical and social support) <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings:</i> Reduced UPS (last 30 days)
Larkin et al., 2003 [65]	<i>Recruitment</i> Public area/community <i>Intervention</i> Health clinic <i>Sample</i> N = 250, 55% AA male	1 comparison group (Attention Control), 1 intervention group (Network-Oriented Peer Outreach) Assignment: Random Unit of delivery: Group	<i>Comparison group:</i> HIV knowledge, addiction and family dynamics <i>Intervention group components:</i> HIV knowledge, normative influence, safer sex negotiation, leadership and communication skills, safer sex exercise, street outreach <i>Cultural and gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings:</i> Increased change in condom use among casual partners
Lurigio et al., 1992 [66]	<i>Recruitment</i> Adult Probation Depart. <i>Intervention</i> Adult Probation Dept. <i>Sample</i> N = 99, Approx. 77% AA male	1 <i>comparison group</i> Education: (Heart Disease), 1 intervention group: (HIV education) Assignment: Random Unit of delivery: Individual and Group	<i>Comparison groups:</i> Heart disease prevention strategies <i>Intervention group components:</i> HIV/STD knowledge and information, motivation and intention, condom use skills, skills using lubricants, cleaning needles; using dental dams	<i>Assessments</i> Baseline and (approx) 1 month follow-up <i>Findings:</i> Condom use

Author Date Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
McMahon et al., 2001[67]	<i>Recruitment</i> Drug Treatment Program (VA Hospital) <i>Intervention</i> Drug Treatment Program (VA Hospital) <i>Sample</i> N = 149, 59% AA male	1 comparison group: (Standard care), 1 intervention group (Cognitive-behavioral HIV risk reduction Program) Assignment: Random Unit of delivery: Group	<i>Cultural &amp; gender relevancy:</i> None reported  <i>Comparison group:</i> Basic information about HIV, HIV risk behaviors, and risk reduction practices <i>Intervention group components:</i> HIV knowledge/information, condom use skills, safer sex negotiation skills, other sex-related communication skills, needle use skills, personal risk/vulnerability assessment <i>Cultural &amp; gender relevancy:</i> Cultural and gender specific materials	<i>Assessments</i> Baseline and 12-month follow-up <i>Findings</i> Increases in # of unprotected sex acts
Magura et al, 1994 [68]	<i>Recruitment</i> Correctional <i>Intervention</i> Correctional <i>Sample</i> N = 157, 65% AA men	1 comparison group (wait-list control), 1 intervention group (AIDS Education Program) Assignment: Convenience Unit of delivery: Group	<i>Comparison group:</i> Wait-list <i>Intervention group components:</i> HIV knowledge, attitude towards high-risk behavior, decision-making/problem-solving skills, protecting oneself, protecting family/significant others, general health care, drug treatment, personal risk/vulnerability <i>Cultural &amp; gender relevancy:</i> Gender-matched participants, gender appropriate materials	<i>Assessments</i> Baseline and 5-month follow-up <i>Findings</i> Increased condom use during vaginal sex Increased condom use during oral & anal sex
Maher et al.,2003[69]	<i>Recruitment</i> STD Clinic <i>Intervention</i> Community location convenient to participant <i>Sample</i> N = 581, 100% AA male	1 comparison group: (Routine counseling), 1 intervention group (Intensive counseling) Assignment: Random Unit of delivery: Individual	<i>Comparison group:</i> Standard of care (STD clinic) <i>Intervention group components:</i> Personal risk assessment, HIV knowledge, motivation to protect oneself and others, attitude and beliefs about STDs, changing social norms, condom use skills, safer sex negotiation skills, alternatives to intercourse, future education and job plans <i>Cultural &amp; gender relevancy:</i> Intervention materials culturally specific, Counselors familiar and sensitive to cultural norms, values, and traditions	<i>Assessments</i> Baseline and 12 months <i>Findings</i> STD incidence lower for interv group compared to comparison group
Malow et al., 1994 [70]	<i>Recruitment</i> VA hospital drug txt <i>Intervention</i> VA hospital drug txt <i>Sample</i> N = 152, 100% AA men	1 comparison group (Videotape and printed material), 1 intervention group (Psychoeducational program) Assignment: Random Unit of delivery: Group	<i>Comparison group:</i> HIV risk reduction education via videotape and printed materials <i>Intervention group components:</i> HIV knowledge, motivation/intention, condom use attitudes, self-efficacy, correct condom use, safer sex negotiation, needle cleaning, personal risk/vulnerability	<i>Assessments</i> Baseline and 3-month follow-up <i>Findings</i> Greater UPS reduction among interv group compared to control group

Author Date Intervention	Recruitment/Intervention Setting/Sample Description	Study Groups, Assignment Method, Unit of delivery	Intervention Components/Cultural & Gender Relevancy (Materials, Facilitator/Participant Matching)	Assessments Period (s) & Findings
Martin et al., 2003 [71]	<i>Recruitment</i> Correctional Intervention Not reported <i>Sample</i> (of men reporting any UPS) <i>N</i> = 294 58% AA male	1 comparison group (enhanced NIDA intervention), 1 intervention group (Focused Intervention) Assignment: Random Unit of delivery: Group	<i>Cultural &amp; gender relevancy</i> Ethnic and Gender matched deliverers Culturally and gender appropriate materials used  <i>Comparison group</i> : Pre-test counseling for HIV & Hepatitis, HIV and Hepatitis information, condom use, needle cleaning, communication skills, HIV test  <i>Intervention group components</i> HIV knowledge, correct condom use, decision making/problem-solving, needle cleaning skills, though mapping, drug treatment benefits, protecting oneself, protecting family/significant others, personal risk/vulnerability, personalized risk reduction plan  <i>Cultural &amp; gender relevancy</i> : None reported	<i>Assessments</i> Baseline and 6 month follow-up <i>Findings</i> Reduced UPS
McCoy et al., 1990 [72]	<i>Recruitment</i> Public area/community <i>Intervention</i> Storefront Assessment Center <i>Sample</i> <i>N</i> = 88, 52% AA men (stratified)	1 comparison group (HIV risk reduction education, referrals), 1 intervention group (NADR-Belle Glade) Assignment: Random Unit of delivery: Group	<i>Comparison group</i> : HIV risk reduction education, referrals to services)  <i>Intervention group components</i> Condom use skills, needle cleaning practices, HIV C&T, bleach kits, condoms, encouragement of safer sex negotiation, HIV knowledge/information, motivation/intentions, attitudes toward risk reduction, personal responsibility, personal risk/vulnerability, personalized risk reduction plan, self-esteem, HIV/STI related care, general health care (including mental health), drug txt.  <i>Cultural &amp; gender relevancy</i> : Culturally appropriate materials used	<i>Assessment</i> Baseline and 6-month follow-up <i>Findings</i> Consistent condom use increased
Mercalf et al., 2005 [73]	<i>Recruitment</i> STD Clinic <i>Intervention</i> STD Clinics <i>Sample</i> (Stratified data) <i>N</i> = 906, 100% AA men	1 comparison group (counseling), 1 intervention (counseling + booster) Assignment: Random Unit of delivery: Individual	<i>Comparison group</i> : HIV knowledge, motivation/intention, attitude toward condom use, condom use self-efficacy, social support, personal risk/vulnerability, personalized risk reduction planning, goal setting  <i>Intervention group components</i> HIV knowledge, motivation/intention, attitude toward condom use, condom use self-efficacy, social support, personal risk/vulnerability, personalized risk reduction planning, goal setting, PLUS booster package  <i>Cultural/Relevancy</i> : None reported	<i>Assessment</i> Baseline and 3 month follow-up <i>Findings</i> Greater STD rate reduction among interv group compared to control Greater reduction in sex risk behaviors for booster group compared to non-booster group

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NIMH et al., 1998 [74]	<i>Recruitment</i> STD Clinic <i>Intervention</i> STD Clinic <i>Sample</i> N= 3706, 74% AA male	1 comparison group (Education), 1 intervention group (Small group sessions focusing on risk reduction skills-building) Assignment: Random Unit of delivery: Group	<i>Comparison group</i> : Education session <i>Intervention group components</i> : Condom use skills, decision-making/problem-solving skills HIV knowledge, safer sex negotiation. <i>Cultural &amp; gender relevancy</i> : None reported	<i>Assessments</i> Baseline and 6, 12-month follow-ups <i>Findings</i> Reduced UPS, increased condom use, reduced STI incidence
O'Donnell et al., 1998 [75]	<i>Recruitment</i> STD Clinic <i>Intervention</i> STD Clinic <i>Sample</i> N= 2004, 62% AA male	1 comparison group (Standard care), 2 intervention groups: (Video viewing only, Video viewing followed by interactive group discussion) Assignment: Proportionate random sampling plan (reflective of clinic patient population) Unit of delivery: Group	<i>Comparison group</i> : Standard of care Intervention groups components (2 groups) <i>Video viewing only</i> : Provided education about STDs and prevention, positive attitudes about condom use, and modeled strategies for condom use in various sexual relationships. <i>Video viewing/discussion</i> : Addresses HIV knowledge, motivation to protect oneself and others, and attitudes toward condom use, safer sex negotiation skills, overcoming barriers to condom use <i>Cultural &amp; gender relevancy</i> : AA and gender specific materials (videos). Gender matched facilitator (men).	<i>Assessments</i> Baseline and follow-up (avg. 17 months) via clinical records <i>Findings</i> New STIs lower among interv (video/discussion) group compared to comparison group.
O'Leary et al., 1998 [76]	<i>Recruitment</i> STD Clinic <i>Intervention</i> STD Clinic <i>Sample</i> N= 659, Approx. 54% AA male	1 comparison group: (Standard Care), 1 intervention group (Intensive HIV Risk Reduction) Assignment: Random Unit of delivery: Group	<i>Comparison group</i> : Standard care <i>Intervention group components</i> : Addresses personal risk, HIV/STD knowledge, and condom use self-efficacy, correct condom use skills, negotiating safer sex skills <i>Cultural &amp; gender relevancy</i> : None reported	<i>Assessments</i> Baseline and 3 months <i>Findings</i> # of sex ptns lower among interv group. # of unprotected sex acts lower overall between BL and 3 M assessments in both groups.
Otto-Salaj et al., 2001 [77]	<i>Recruitment</i> Community Mental Health Clinic <i>Intervention</i> Community Mental Health Clinic <i>Sample</i> N= 189, >50% AA male	1 comparison group (Health Promotion), 1 intervention group (cognitive-behavioral intervention) Assignment: Random Unit of delivery: Group	<i>Comparison group</i> : Stress, nutritional health, cancer, heart disease, personal relationships <i>Intervention group components</i> : HIV knowledge, self-efficacy for risk reduction behavior, assertiveness skills, decision making/problem-solving skills, goal setting, safer sex negotiation skills, sexual communication skills, protecting oneself, personal responsibility, personal risk/vulnerability, personalized risk reduction plan, enhancing risk reduction skills for purposes of empowerment	<i>Assessment</i> Baseline and 3, 6, 12 months follow-ups <i>Findings</i> Reduced UPS, increased protected sex



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Saint Lawrence et al., 1995 [78]	<i>Recruitment</i> Health care center <i>Intervention</i> Not reported <i>Sample</i> N= 3706, 28% AA. male (stratified data)	1 comparison group (education only), 1 intervention (educational and behavioral skills) Assignment: Random Unit of delivery: Group	<i>Comparison group</i> : Education session <i>Intervention group components</i> : Condom use skills, assertiveness skills, decision-making/problem-solving skills, safer sex negotiation skills, social support, protecting oneself, protecting family/significant others, personal risk/vulnerability, personalized risk reduction planning, risk reduction self-efficacy, HIV knowledge/information, attitudes toward condom use, normative influence, safer sex negotiation. <i>Cultural &amp; gender relevancy</i> : Gender-matched deliverers, Culturally appropriate materials	<i>Assessments</i> Baseline and 3, 6, 12-month follow-ups <i>Findings</i> Reduced UPS among AA males
Saint Lawrence et al., 1999 [79]	<i>Recruitment</i> Correctional <i>Intervention</i> Correctional <i>Sample</i> N= 361, 70% AA male	1 comparison group (Anger Management), 1 intervention group (Sexual Risk Reduction Skills Training) Assignment: Random Unit of delivery: Group	Comparison: Anger management, providing positive/negative feedback, accepting criticism, resisting peer pressure, conflict resolution <i>Intervention</i> HIV knowledge, correct condom use, safer sex negotiation, refusing unwanted sexual initiations, self-reinforcement of adaptive behavior <i>Cultural &amp; gender relevancy</i> : Gender-matched deliverers	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced UPS, increased proportion of condom-protected sex, increased condom-protected vaginal sex
Siegal et al., 1995 [80]	<i>Recruitment</i> Public area/community Open-air drug markets <i>Intervention</i> Not reported <i>Sample</i> N= 434, >50% AA male	1 comparison group (HIV education, 1 intervention group (NADR-Dayton & Columbus) Assignment: Non-RCT (systematic assignment) Unit of delivery: Group	<i>Comparison group</i> : HIV education via literature and demonstration <i>Intervention group components</i> : Condom use skills, decision making/problem-solving, safer sex negotiation, bleach use, HIV/STI related care, General health care, drug tx, personal responsibility, personal risk/vulnerability, HIV knowledge/information <i>Cultural &amp; gender relevancy</i> : None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced score on sex risk index (# sex pps, type of sex, frequency of CU w/sex)
Stephens et al., 1993 [81]	<i>Recruitment</i> Health care clinics <i>Intervention</i> Community (Assessment Center) <i>Sample</i> N= 512, >50% AA male	1 comparison group: HIV risk reduction education, referrals to services, 1 intervention group: (NADR Study-Miami) Assignment: Random Unit of delivery: Individual and Group	<i>Comparison group</i> : HIV risk reduction education, referrals to services) <i>Intervention group components</i> : Condom use skills, needle cleaning practices, bleach kits, condoms, HIV knowledge/information, motivation/intentions, attitudes toward risk reduction, personal responsibility, personalized risk reduction plan, self-esteem, safer sex negotiation, problem	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced score on sex risk index (# sex pps, type of sex, frequency of CU w/sex)

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Stephens et al., 1993 [81]	<i>Recruitment</i> Public area/community <i>Intervention</i> Community <i>Sample</i> N = 508, >50% AA male	1 comparison group (HIV risk reduction education, referrals to services), 1 intervention group: (NADR Study-Cleveland) Assignment: Random Unit of delivery: Individual and Group	solving, HIV/STI related care, general health care (including mental health), drug txt. <i>Cultural &amp; gender relevancy:</i> Culturally appropriate materials used  <i>Comparison group:</i> HIV/AIDS education and referrals to needed community services (e.g. HIV C&T) <i>Intervention group components:</i> Condom use skills, decision making/problem solving, safer sex negotiation, bleach use, risk avoidance, condom distribution, bleach kits, HIV/STI related care, general health care (including mental health), drug txt. <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced score on sex risk index (# sex ptrs, type of sex, frequency of CU w/sex)
Stephens et al., 1993 [81]	<i>Recruitment</i> Public area/community <i>Intervention</i> None reported <i>Sample</i> N = 90; >50% AA male	1 comparison group (AIDS education and referrals) and 1 intervention group (NADR-Jersey) Assignment: Random Unit of delivery: None reported	<i>Comparison group:</i> AIDS education and referrals <i>Intervention group components:</i> Information not available <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced score on sex risk index (# sex ptrs, type of sex)
Stephens et al., 1993 [81]	<i>Recruitment</i> Public area/community <i>Intervention</i> None reported <i>Sample</i> N = 323; >50% AA male	1 comparison group (AIDS education and referrals) and 1 intervention group (NADR-Newark) Assignment: Random Unit of delivery: None reported	<i>Comparison group:</i> AIDS education and referrals <i>Intervention group components:</i> HIV knowledge/information <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced score on sex risk index (# sex ptrs, type of sex)
Stephens et al., 1993 [81]	<i>Recruitment</i> Public area/community Community-based establishments Correctional settings Residential <i>Intervention</i> None reported <i>Sample</i> N = 415, >50% AA male	1 comparison group (AIDS information and demonstration), 1 intervention (NADR-New Orleans) Assignment: Random Unit of delivery: Individual and Group	<i>Comparison groups:</i> AIDS information and demonstration <i>Intervention group components:</i> Condom use skills, decision making/problem solving, safer sex negotiation, risk avoidance & needle cleaning, bleach kits and condoms, personal risk/vulnerability, HIV knowledge/information, HIV/STI related care, general health care (including mental health), drug txt. <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 6-month follow-up <i>Findings</i> Reduced score on sex risk index (# sex ptrs, type of sex, frequency of CU w/sex)
Susser et al., 1998 [82]	<i>Recruitment</i> Community Based Establishment <i>Intervention</i> Community <i>Sample</i> N = 59, 58% AA male	1 comparison group (Education), 1 intervention group (Sex, Games, and Videotape) Assignment: Random	<i>Comparison group:</i> HIV/STD knowledge, condom use instructions <i>Intervention group components:</i> HIV knowledge/information, condom use skills, safer sex negotiation skills,	<i>Assessments</i> Baseline, 6-month, & 12-month follow-ups <i>Findings</i> Unprotected sex episodes lower in

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Wenger et al., 1991 [83]	<i>Recruitment</i> STD clinic <i>Intervention</i> STD Clinic <i>Sample</i> N = 256, Approx. 55% AA male	Unit of delivery: Group  1 comparison group: (AIDS education alone), 1 intervention group: (AIDS education and HIV test with results) Assignment: Random Unit of delivery: Individual	sex risk reduction self-efficacy, personal risk/vulnerability assessment <i>Cultural &amp; gender relevancy:</i> Ethnic-matched facilitators  <i>Comparison group:</i> AIDS Education <i>Intervention group components:</i> HIV knowledge and personal risk, condom use skills, and HIV C&T <i>Cultural &amp; Gender Relevancy:</i> None reported	intervention group compared to comparison group  <i>Assessments</i> Baseline and 2-month follow-up (via mail questionnaire) <i>Findings</i> Condom use with last partner increased for intervention group compared to comparison group.
Wolitski et al., 2006 [84]	<i>Recruitment</i> Correctional <i>Intervention</i> Correctional <i>Sample</i> N = 522, 52% AA male	1 comparison group: (Standard Education), 1 intervention group: (Enhanced Intervention) Assignment: Random Unit of delivery: Individual	<i>Comparison group:</i> HIV knowledge, personalized risk reduction plans, referrals, skills training <i>Intervention group components:</i> Personalized risk reduction plan, HIV knowledge, motivation to protect oneself and others, prevention case mgmt., harm reduction, problem solving skills <i>Cultural &amp; gender relevancy:</i> None reported	<i>Assessments</i> Baseline and 24-week follow-up <i>Findings</i> UPS lower among interv. group compared with comparison